REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Briefly recapitulating, Claims 9-18 are pending with Claims 16-18 added by the present amendment.

In the Official Action, Claims 9-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pombo et al. (U.S. Patent No. 5,799,256, hereinafter Pombo) in view of Sato (U.S. Patent No. 5,953,677).

New dependent Claims 16-18 are directed to additional features disclosed in Applicants' originally filed specification.[1] No new matter is added.

Briefly recapitulating, Claim 1 is directed to a mobile terminal that includes: a transmitter/receiver configured to transmit/receive a signal to/from a base station; a communication state determination unit configured to determine a communication state of the transmitter/receiver; a movement state measurement unit configured to measure a movement state of the mobile terminal; and a reception period controller configured to control a reception period for receiving a control signal transmitted from the base station by the transmitter/receiver, based on a communication state determination result determined by the communication state determination unit and a movement state measurement result measured by the movement state measurement unit.

Pombo discloses a method for conserving battery power in a battery operated communication device by using predictions of user location, user movement and user actions.[2] To enhance user convenience, the method and apparatus of Pombo operates to reduce consumption of energy stored in the battery 120 by powering down or removing

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[1] Specification at page 8, line 26 through page 9, line 34.
[2] Pombo, abstract.

power from elements of the mobile station when those elements are not in use. Moreover, the method and apparatus according to Pombo operates to extend battery life by predicting user location, mobility and action. There are three main processes which may be combined to reduce power consumption. One of the processes predicts user ***location***. A second process predicts user ***movement***. A third process predicts ***when the user needs to communicate***.[3]

Regarding the first process (predicting user location), Pombo discloses that predicting user location allows the mobile station 104 to only search for control channels broadcast by base stations in the locations where the user and the mobile station 104 will be present. Since not all control channels are broadcast by all base stations, if the mobile station 104 can determine which control channels are in use, the mobile station can reduce the time during which the receiver 108 must be powered up, drawing power from the battery 120. For example, in a PHS system, the mobile station 104 can reduce battery consumption by only searching for predicted control channels, rather than all 77 control channels. In accordance with the present invention, the mobile station 104 maintains a historical record of past base station communications and associated times when a control channel from a particular base station was detected. The mobile station 104 will search for a base station more frequently around the time and on the channels where the base was previously found and less frequently otherwise. When not searching, the mobile station 104 will remain in a low-power sleep mode.[4]

Regarding the second process (predicting user movement), Pombo discloses predicting user movement allows the mobile station 104 to eliminate unnecessary registration to other base stations when the mobile station 104 is already locked to a base station. In accordance with the present invention, the mobile station monitors the control channel of the

[3] Pombo, column 5, lines 11-23.
[4] Pombo, column 5, lines 23-42.

base station it is locked to and the surrounding base stations' control channels. The received signal strength (RSSI) for each base is detected and stored. The algorithm uses a weighted table of signal strength samples collected for base stations detected by the mobile station 104 to determine user movement. The mobile station generally remains in a low-power sleep mode, wherein elements such as the receiver 108 and the transmitter 110 are powered down to conserve energy stored in the battery 120. After a predetermined time period, such as 1.5 seconds, the handset periodically changes from the sleep mode to an active mode by powering up the receiver 108 and associated circuitry. If the signal strength of the control signal broadcast by the base station the mobile station 104 is locked to is below an acceptable level, the mobile station 104 scans the control channels recommended by the algorithm that predicts user location. If the expected base is not found, then every other time the mobile station wakes up, all the control channels are scanned. As the mobile station moves, establishing communication and registering with various base stations, the mobile station collects a history of the signal strength the base is locked to and surrounding bases. In this manner, the mobile station 104 can determine if the user and mobile station 104 are moving away from the base the mobile station is locked to (the current best base) and toward an adjacent base (or potential best base). Average signal strengths from the two bases are used to determine if the user is moving.[5]

Regarding the third process (predicting when a user needs to communicate), Pombo discloses predicting when the user needs to communicate allows the mobile station to enter a very low power mode or continuous sleep mode. In the continuous sleep mode, in distinction to the sleep mode, the mobile station 104 does not wake up periodically (for example, every few seconds) to detect a control channel. Rather, the mobile station in continuous sleep mode remains largely powered down (but not turned off) for an extended period of time. When the

[5] Pombo, column 5, line 43 - column 6, line 7.

extended period of time elapses, the mobile station again powers up to search for a control channel.[6]

The sleep time associated with the third process (predicting when a user needs to communicate) corresponds to the duration of the period during which the mobile station 104 enters a low-power sleep mode. The sleep time is set equal to the difference between the next call time and the current time. The next call time is determined by predicting from the data stored in the call activity table when the next call is likely to be made by the user. At step 612, if the calculated sleep time exceeds an hour, the sleep time will be reset to a maximum of one hour.[7]

In a further discussion about the third process (predicting when a user needs to communicate), Pombo discloses the mobile station reduces battery power consumption by increasing the channel search period during times when the control activity table indicates control activity is less likely. Stated alternatively, the mobile station decreases the frequency at which it searches for control channels during such times. As an example using the control activity table data above, during the time from 3 AM to 10 AM, the control activity table records no registrations or other control activity. Similarly, when the user is in his office or in the cafeteria, few registrations are recorded. Detecting this, the mobile station increases the control channel search period during these times. For example, the control channel search period is increased from 1.5 seconds to 5 seconds to 10 seconds (FIG. 5, FIG. 6). The mobile station may even enter a low power sleep mode for a predetermined sleep time (step 614). Other than when searching for a control channel, the power to the receiver 108 and the transmitter 110 is cut off, saving battery power. By powering the receiver 108 only during the occasional search periods, battery power consumption is greatly reduced.[8]

[6] Pombo, column 6, lines 8-17.
[7] Pombo, column 11, lines 12-19.
[8] Pombo, column 12, line 65 – column 13, line 16.

As acknowledged in the Official Action, Pombo does not disclose or suggest a movement state measurement unit or a reception period controller configured to control a reception period based on a movement state measurement result.

However, contrary to the Official Action, Pombo does not disclose or suggest a reception period controller configured to control the reception period based on a reception state measurement result. That is, while Pombo discloses that three processes may be combined to reduce power consumption (predicted user location, predicted user movement, and a predicted time to communicate), Pombo discloses that these three techniques are used serially and not in parallel. That is, the device of Pombo measures signal strength of a control signal broadcast by a base station only to determine or predict user movement.[9] Pombo does not use the measured signal strength to control a reception period. As shown in Figure 6 of Pombo and as disclosed in the text of Pombo,[10] the signal strength measurements are used by an algorithm only to control battery operations, not reception periods. Instead, Pombo controls a reception period only based on stored call activity records, not on a reception state measurement result ("The next call time is determined by predicting from the data stored in the call activity table when the next call is likely to be made by the user.")

In summary, Pombo discloses a variety of independent alternative power saving processes, but explicitly teaches away from Applicants' claimed hybrid process. Furthermore, the control of a search period of Pombo is different from Applicants' claimed control of a reception period

Gershon also does not disclose or suggest a reception period controller configured to control a reception period based on a reception state measurement result. Instead Gershon discloses a mobile telephone apparatus is capable of determining whether the apparatus is in a

[9] Pombo column 5, line 43 - column 6, line 7.
[10] Pombo column 6, lines 8-17, column 11, lines 12-19, and column 12, line 65 through column 13, line 16.

moving or static condition. The detection of the moving or static condition is used by Gershon only to control battery operations.[11] A reception period is not controlled by the motion detection of Gershon. Gershon also does not disclose or suggest Applicants' claimed reception controller configured to control a reception period based on a reception state measurement result.

MPEP §706.02(j) notes that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Also, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicants' disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir.1991). Without addressing the first two prongs of the test of obviousness, Applicants submit that the Official Action does not present a *prima facie* case of obviousness because both Pombo and Gershon fail to disclose all the features of Applicants' claimed invention.

[11] Gershon column 2, line 41 through column 3, line 5; see also Figure 2.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

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